GONIOZUS PAKMANUS (HYMENOPTERA: BETHYLIDAE), A NEW SPECIES IMPORTED INTO CALIFORNIA FOR THE BIOLOGICAL CONTROL OF PINK BOLLWORM, *PECTINOPHORA GOSSYPIELLA* (LEPIDOPTERA: GELECHIIDAE)[1]

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ABSTRACT: *Gonziozus pakmanus*, new species, is described from material imported into California from Pakistan for the biological control of pink bollworm, *Pectinophora gossypiella* (Saunders). The parasite is being propagated at the University of California for release in northern Mexico and Arizona against this pest of cotton.

Goniozus Foerster is a cosmopolitan genus of primitive aculeate Hymenoptera (Chrysidoidea: Bethylidae). Presently I recognize 141 nominal species in this genus, all of which are presumed primary, external parasites of Lepidoptera larvae. Some details of the potential and realized usefulness of members of this genus to applied biological control programs have been published elsewhere (Gordh et al., 1983).

During 1982, Professor E. F. Legner, Division of Biological Control, UCR, imported an undescribed species of *Goniozus* from Pakistan where it was collected on cotton. This paper provides a name for that species. The parasite appears relatively restricted in its host preference in laboratory studies and details of its biology will be published elsewhere. The parasite is being released in untreated cotton near Mexicali, Mexico and Phoenix, Arizona.

The terminology of Evans (1964) is used in the following description.

Goniozus pakmanus, new species.

♀ Holotype 2.58 mm long (2.55 ± 0.19; n = 42). Body jet black, mandibles amber with apices darker. Coxae concolorous with body; trochanters pale; femora black, apically pale, middle and hind femora somewhat paler, tibiae, tarsi, antenna concolorous, tan. Wings hyaline.

Head in dorsal aspect slightly longer than wide (Fig. 2) (holotype 1.09; 1.09 ± 0.02; n = 39), surface finely, uniformly reticulate with moderate vestiture of shallow setigerous punctures except posteriad of compound eye. Clypeus protuberant, well formed with narrow, well-defined median longitudinal carina projecting caudad between dorsal margins of scrobes. Scrobes ecarinate. Ocelli forming an obtuse triangle, lateral ocellus about 0.5 times ocellar diameter from posterior margin of head. OOL:WOT 10:8 (holotype). Mandible quadridentate, teeth not large but third tooth largest. Antennal configuration as shown (Fig. 7).

[1]Received April 28, 1984. Accepted June 25, 1984.

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Propodeum shield-shaped (Fig. 3). Median discal and sublateral carinae absent; anteriomedial area forming a slightly elevated, polished, triangular area projecting well beyond half-length of propodeum anterior of transverse carina; remainder of propodeal disc reticulate. Lateral carina narrow, well-defined, complete; lateral face of propodeum reticulate, with pattern somewhat more bold than dorsal disc. Transverse carina complete, poorly defined; posterior declivity reticulate, pattern larger and weaker than discal pattern. Forewing shape, venation and chaetotaxy as illustrated (Figs. 4, 5). Metepimeron forming a small, acutely triangular sclerite with dorsal two thirds densely setose. Fore femur slightly less than two times longer than wide (holotype 23:12).

♂ Similar to female in habitus, sculpture and chaetotaxy. Differing in its smaller size (allotype 2.09 mm; 2.06 ± 0.14; $n = 38$), ocellar size, apical six segments of the antenna more dusky, mandible yellow with reddish apex and head in frontal view very slightly longer than wide (2 (1.01 ± 0.02; $n = 52$; allotype 1.03) (Fig. 1). Genitalia as illustrated (Fig. 6), and apical sternum with a well-defined posteromedial notch (Fig. 8).

Described from 111 ♀♀ and 79 ♂♂ card-point, lab reared specimens at the University of California, Riverside (importation number R-82-47) on *Pectinophora gossypiella* and parts of 28 slide-mounted specimens reared from the same facility. The original material was received by E.F. Legner from A.I. Mohyaddin, who collected parent stock from cotton at Bhai Phero (Lahore), Raiwind (Qasur), Pakistan during October 1982. Holotype, 5 ♀♀ and 5 ♂♂ paratypes deposited in the California Academy of Science, San Francisco; 2 ♀♀ and 2 ♂♂ paratypes deposited in the following institutions: U.S. National Museum, Washington, DC; Canadian National Collection, Ottawa; Colorado State University, Fort Collins; Zoological Institute, Leningrad; Plant Protection Research Institute, Pretoria; Ehime University, Matsuyama. The remainder of the paratypical series is deposited at UCR.

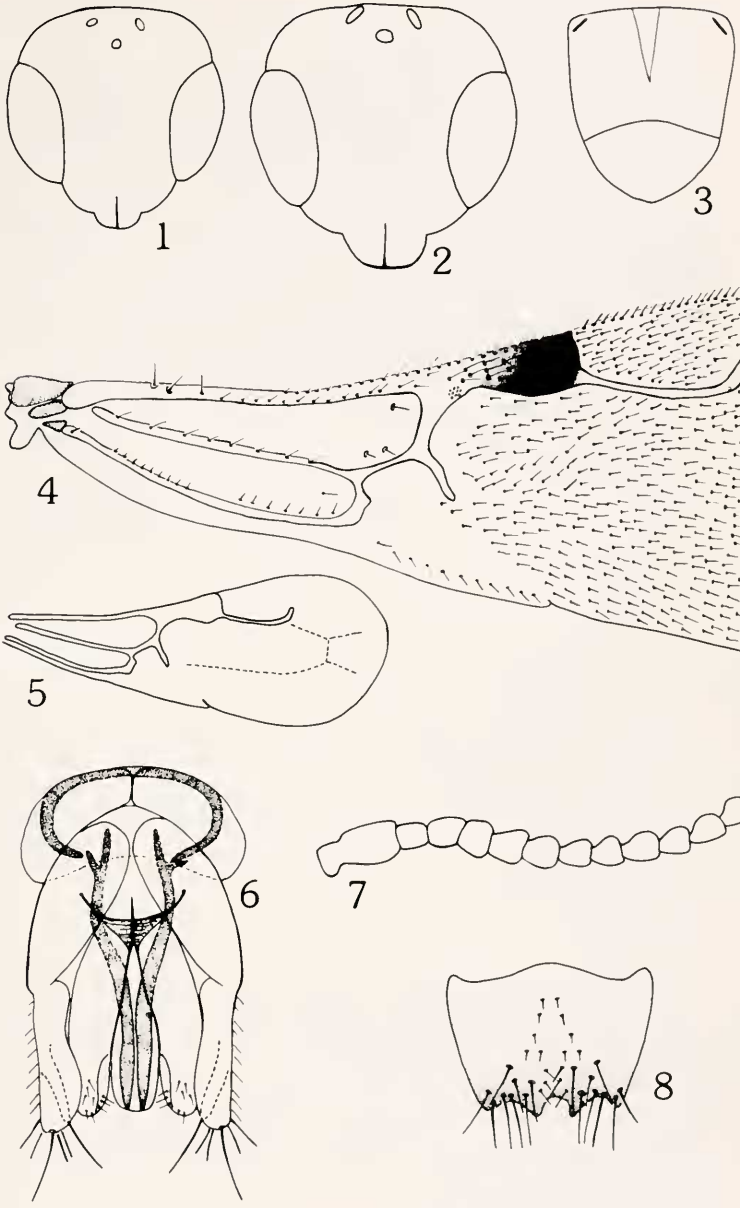
For nomenclatural purposes the specific epithet (*pakmanus*) may be regarded as an arbitrary combination of letters and is masculine in gender.

DISCUSSION

The morphological differences between sexes are slight with females being larger, the ratios of head length to width are different, males have pale mandibles, and the ocellar size and triangle formation is different. Understandibly, *G. pakmanus* does not fit well into the species groups of *Goniozus* proposed by Evans (1978) for North American representatives of the genus, and species groups have not been developed for other zoogeographical realms. The new species shares important features with the **Floridanus** and **Aethiops Groups** in lacking a scrobal carina, the forewing basal vein is long (Figs. 4,5) but the areolet is incomplete, the propodeum possesses a complete but weakly developed transverse carina (Fig. 3) and *pakmanus* further resembles *aethiops* in structure of the clypeus.

Goniozus pakmanus is provisionally assigned to the **Aethiops Group.** It runs to *G. aethiops* in Evans' (1978) key and is distinguished from

Figs. 1-8. *Goniozus pakmanus* new species. 1. Male head, dorsal aspect. 2. Female head, dorsal aspect. 3. Female propodeum, dorsal aspects. 4. Female forewing venation and chaetotaxy (detail). 5. Female forewing (obsolete veins represented by dashed lines). 6. Male genitalia, ventral aspect. 7. Female antenna. 8. Male apical sternal of gaster.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aethiops by the large body size, black mandible, polished and nearly impunctate head, dark coloration of the prostigma, and sculpture of the propodeum of that species. Both species are on cotton.

Twenty-three species are current assigned to *Goniozus* from the Indian subcontinent (Gordh, unpublished). Kieffer's (1914) keys to oriental *Goniozus* are outdated and many types of species described by him cannot now be located. Kurian (1954a) prepared a provisional catalog of oriental bethylids and keys to the species then assigned to *Goniozus* and its synonym *Perisierola* (Kurian 1954b, 1955). Beyond these works nothing has been attempted on bethylids taxonomically. *Goniozus pakmanus* does not fit well in existing keys to oriental bethylids and a revision of the species of the region must be undertaken before an understanding of the affinities of *G. pakmanus* to the endemic fauna of that region can be attempted.

Thirty-six species of *Goniozus* are recognized in North America, including species previously assigned to *Parasierola* (in Krombein et al., 1979). Three species have been purposefully introduced for biological control programs in California. *Goniozus aethiops* Evans was described from material collected in Ethiopa during 1970 by B. R. Bartlett for control of PBW; it has not been recovered (but there have not been attempts at recovery). *Goniozus legneri* Gordh was imported from Uruguay by E. F. Legner for control of the navel orangeworm, *Paramyeois transitella* (Walker); this parasite has been recovered and is providing biological control of NOW. This parasite will attack PBW under laboratory conditions, but it has not been released against this pest on cotton in California. A third species, *G. emigratus* (Rohwer), was described from material taken in Hawaii, but Rohwer believed the species was originally from North America and noted that August Busck had reared it from PBW (Rohwer 1917). This parasite was collected in Texas by Legner and details of its biology have been published (Swezey, 1915; Busck 1917; Bridwell 1919; Poulton 1922; Gordh and Hawkins 1981). With the release of *G. pakmanus* we potentially have 39 described species of *Goniozus* occurring in North America.

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The Preservation Librarian, Ms. Myra Jo Moon, Colorado State University, Fort Collins, CO 80523, has written *Ent. News* to alert readers, particularly institutional librarians, about a deterioration problem relating to the publication, *Genera Insectorum.* Over the years, the protective tissues for the illustrations have become adhered to the colored lithographics of the insects. These tissues can not be removed by merely trying to pull them away. Scraping with a sharp knife also removes the color along with the tissue. Ms. Moon indicates she was able to remove the tissues by carefully wetting the tissues with water and gently lifting them with a thin spatula blade so as not to remove the color of the lithographs. The color is not water soluble nor does the water absorb into the paper of the plates. After removing all the tissues throughout the entire set, the tissues were replaced with a neutral acid free glassine paper to prevent the illustrations from bleeding onto the facing pages. Further details may be obtained from Ms. Moon, to whom *Ent. News* expresses appreciation for writing to alert readers about this situation.

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